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The Veterinary Record

v.69-no 44
nov 2/57

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VOL. 69 NO. 44 ISSUE NO. 4152 1021-1040 NOVEMBER 2nd 1957

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No. 44 NOVEMBER 2nd, 1957 Vol. 69

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Wastage and Culling in Private Milk Records Herds, 1955-6

BY

A. STEWART and L. K. O'CONNOR

Milk Marketing Board, Thames Ditton, Surrey

SUMMARY.—1. *Culling and wastage during* 1955-6 *in* 11,000 *Private Milk Records herds containing* 200,000 *cows has been estimated from information collected by* 43 *fieldsmen during* 1 *week of each month.*

2. *During* 1955-6 23.9 *per cent. of all cows in P.M.R. herds were lost to dairying (true wastage). A further* 5.3 *per cent. of all cows were sold for dairying. Thus deaths and disposals accounted for* 29.2 *per cent. of all cows in P.M.R. herds during* 1955-6.

3. *The relative importance of the causes of wastage was:—*

Death on farm 1.0 *per cent., old age* 1.8 *per cent., infertile* 3.2 *per cent., disease and accident* 4.5 *per cent., poor yield* 5.6 *per cent., miscellaneous (sold for slaughter)* 7.8 *per cent., sold for dairying* 5.3 *per cent.*

4. *Culling was most severe amongst third calvers.*

5. *True wastage amongst heifers was* 7.9 *per cent., but an additional* 6.9 *per cent. were sold for dairying.*

6. *The relative importance of the causes of wastage in heifers was:—*

Death on farm 0.3 *per cent., infertile* 3.8 *per cent., disease and accident* 1.1 *per cent., sold for slaughter* 2.7 *per cent., sold for dairying* 6.9 *per cent.*

7. *Seasonal culling patterns have been discussed.*

THERE are no current estimates available of the extent of herd wastage, the relative importance of the causes of death, and the reasons for disposal of animals in the national dairy herd of England and Wales. A number of herd wastage surveys have been conducted in the past, but these have generally been restricted to, at most, a few counties (Withers, 1955, 1957). In addition, estimates tend to become obsolete, particularly when such powerful forces as breed change-over, attestation, popular grading-up schemes, and attractive beef prices vary from year to year and county to county.

Material and Methods

There are approximately 11,000 herds in the Board's Private Milk Records Scheme and these are scattered throughout England and Wales. Each is visited by a fieldsman once every 3 months. On average in any one week events in 1,020 herds comprising about 19,000 in-milk and dry cows are available to the 43 fieldsmen. Commencing in October, 1955, herd wastage and culling statistics have been collected for 1 week each month by P.M.R. fieldsmen. Information obtained consists of female stock numbers on each farm visited, together with the members' reasons for any changes during the 7 days prior to the fieldsmen's visits. This period was chosen as a compromise between the accuracy of farmers' memories and the need for as wide a coverage as possible. Actual coverage in each of the sampling weeks is shown in Table I (overleaf).

More than half the P.M.R. herds have supplied information for at least 1 of the 12 survey weeks of the 1955-6 survey since the interval between fieldsmen's quarterly visits may vary between 11 and 15 weeks.

The wastage in these 1,020 herds in 1 week provides an estimate of the wastage in all P.M.R. herds, representing about 200,000 milking cows, for a particular month. The totals of monthly estimates provide an estimate of annual wastage.

Deaths and disposals have been classified into the following categories:—

I. *Death.* Actual death on the farm resulting from disease or accident. (It does *not* include animals destroyed on the farm.)

II. *Aged.* Over 8 years or more than 6 calves, if no more important reason for disposals.

III. *Infertile.* Served or inseminated 3 times or more and not in calf; anoestrus; nymphomania; abnormal genitalia; inability to breed for various reasons.

TABLE I
SUMMARY OF P.M.R. HERDS SUPPLYING WASTAGE AND CULLING DATA 1955-6

Sampling week in	Number of herds supplying information	Number of cows in-milk and dry	Number of heifers (6 months to first calving)	Number of calves (birth to 6 months)	Average herd size		
					Cows	Heifers	Calves
Oct., 1955	1,128	20,870	10,294	4,512	18·5	9·1	4·0
Nov., 1955	1,180	21,654	10,578	4,836	18·4	9·0	4·1
Dec., 1955	1,016	18,287	9,273	4,317	18·0	9·1	4·2
Jan., 1956	1,096	19,153	9,029	4,815	17·5	8·2	4·4
Feb., 1956	952	17,398	8,534	4,334	18·3	9·0	4·6
Mar., 1956	943	18,018	8,825	4,598	19·1	9·4	4·9
Apr., 1956	981	18,660	8,588	4,470	19·0	8·8	4·6
May, 1956	1,068	19,678	9,484	4,585	18·4	8·9	4·3
June, 1956	931	17,837	8,407	4,219	19·2	9·0	4·5
July, 1956	954	17,850	8,892	3,834	18·7	9·3	4·0
Aug., 1956	984	19,175	9,570	3,581	19·5	9·7	3·6
Sept., 1956	1,006	19,418	9,490	3,388	19·3	9·4	3·4
Average	1,020	19,000	9,247	4,291	18·6	9·1	4·2

IV. *Disease and Accident.* Disposed of on account of sickness or accident, including animals destroyed on account of sickness and reactors to tuberculin test.

V. *Poor Yield.* Disposed of because yield not up to the production standard of the particular herd.

VI. *Miscellaneous (Sold for Slaughter).* Sold dry and empty after being deliberately withheld from service, or to knacker, dealer, F.M.C., or as fat animals at market.

VII. *Sold for Dairying.* Healthy animals in calf or freshly calved and in milk sold privately or at market because surplus to requirements or because of bad temperament, poor conformation, hard to milk, etc.

To ascertain whether animals disposed of were lost from the national herd or merely changed ownership, the owner was asked whether each animal sold was (a) in calf or empty, (b) in milk or dry, and if the animals were sold to knackers (unfit for human consumption), as casualty slaughterings, for meat, to dealers, privately, or at a market.

This information enabled disposals to be classified accurately and permitted a distinction to be drawn between total herd disposals and true wastage. Separate estimates of wastage were made for the following:—

(a) All female dairy stock which had calved at least once whether in milk or dry.

(b) All female stock intended for dairying, 6 or more months of age and not calved on day of visit.

Wastage and Culling of In-Milk and Dry Cows (1955-6)

A total of 1,290 deaths and disposals were reported during the 12 sampling weeks (1 week in each month). Details of disposals during each sampling week enabled estimates of monthly wastage and culling to be made and the sum of these monthly estimates provided the annual wastage and culling rates. This information was classified according to the reason for disposal and is shown in Table II.

The analysis shows that 23.9 per cent. of the cows in P.M.R. herds were lost to the dairy industry during 1955-6. This represents the true wastage in P.M.R. herds. An additional 5.3 per cent. were sold for dairying purposes so that average herd wastage and culling as distinct from true wastage was 29.2 per cent.

TABLE II
WASTAGE AND CULLING IN PRIVATE MILK RECORDS HERDS (1955–6)
(Stated as percentage of all cows in milk and dry in P.M.R. herds)

	Reason for disposal		Per cent.
I	Death (died on farm, not destroyed) ...		1·0
II	Aged		1·8
III	Infertile		3·2
IV	Disease and accident		4·5
V	Poor yield		5·6
VI	Sold for slaughter		7·8
	Lost to dairying ...		23·9
VII	Sold for dairying :—		
	Surplus to requirements	4·4	
	Bad conformation, hard milkers, etc.	0·9	5·3
	Total deaths and disposals ...		29·2

The estimate of true wastage (23.9 per cent.) means that if total cow numbers remained the same throughout the survey period the estimate of average herd life of animals in P.M.R. herds is 4.2 years. Cow numbers increased in England and Wales during 1955-6 and this is reflected in the monthly estimates for average herd size in Table I. Had cow numbers remained stationary the estimate of average herd life would have been lower.

Causes of Wastage. The relative importance of the individual causes of true wastage and culling is of considerable interest.

Miscellaneous (Sold for Slaughter). The largest contribution was made by disposals classified miscellaneous (sold for slaughter) (7.8 per cent. of all cows). Reasons given by farmers *for the disposal of these animals were generally vague in that many were merely classified as barren.* Many of these cows were deliberately withheld from service—some in " flying " herds and others because the farmer anticipated a

surplus of animals. Since all of these cows were lost to dairying and since there were probably other reasons for their disposal *most of them would normally be allocated among the other reasons for disposal discussed below*. Animals in this category were classified as follows:—

Barren (not necessarily infertile) 6.6 per cent., fat (in calf) 0.3 per cent., poor conformation 0.1 per cent., other causes (including bad temperament, hard milking) 0.8 per cent. Total 7.8 per cent. of all cows or 26.7 per cent. of all disposals.

Low Yield. The second largest group (5.6 per cent. of all cows or 19.1 per cent. of all disposals) comprised animals culled because of low yield. With farmers culling only 1 animal in 18 for low milk yield each year, herd replacements should be of high average merit if real improvements are to be made.

Disease and Accident. Next in importance is the group of animals culled because of disease and accident (4.5 per cent.). The incidence of the various reasons for disposal expressed as percentages of all P.M.R. cows is as follows:—

TB. reactors 1.6 per cent., mastitis 0.7 per cent., damaged udder, teats, or legs 0.4 per cent., Johne's disease 0.4 per cent., aborted 0.2 per cent., " dry-cow " mastitis 0.2 per cent., paralysis, magnesium deficiency, liver trouble, milk fever 0.2 per cent., calving difficulties 0.1 per cent., other causes 0.7 per cent. Total 4.5 per cent. of all cows or 15.3 per cent. of all disposals.

Since attestation is the aim of most farmers it is not surprising to find reaction to TB. test the most important cause of wastage in this category. Despite the introduction of antibiotics mastitis is still a problem and the prominence of Johne's disease is alarming. Abortion, " dry cow " mastitis, and the various metabolic diseases were of relatively minor importance in P.M.R. herds.

Infertility. It was not possible to differentiate between the various causes of infertility (3.2 per cent. of all cows or 11.0 per cent. of all disposals). As a single reason for disposal it was, however, of considerable importance.

Aged. Only 1.8 per cent. of all cows (6.3 per cent. of all disposals) were culled because of old age. Few cows have the opportunity to demonstrate their ability to live to an old age—something else almost always happens to them beforehand.

Death on the Farm. The relative importance of the causes of death on the farm were as follows:—

Difficult calving 0.2 per cent., accident 0.2 per cent., grass staggers, milk fever, bloat, scour, summer mastitis 0.2 per cent., pneumonia, peritonitis 0.1 per cent., other causes 0.3 per cent. Total 1.0 per cent. of all cows or 3.5 per cent. of all disposals.

Sold for Dairying. Though not contributing to true wastage the reasons for animals being sold for dairying are of interest. In order of importance they were as follows:—

Surplus to requirements 4.4 per cent., poor conformation 0.3 per cent., undesirable breeding 0.3 per cent., hard milkers 0.2 per cent., bad temperament 0.1 per cent. Total 5.3 per cent. of all cows or 18.1 per cent. of all disposals.

Seasonal Culling Trends, 1955-6. The separate monthly estimates permitted seasonal culling trends to be studied. Fig. 1 shows the wastage in each month and the contributions of the 7 categories under which reasons for disposals were classified.

During 1955-6 wastage and culling were highest during the period October to January and lowest during June and July. Preliminary results for 1956-7 suggest that in general this seasonal pattern is repeated each year. The most important causes of seasonal variation in wastage and culling are the availability of replacement heifers, housing accommodation, home-grown feed supplies, the seasonal pattern of disease, and market prices for stock.

The majority of milk producers prefer to have animals calving in the autumn so that advantage may

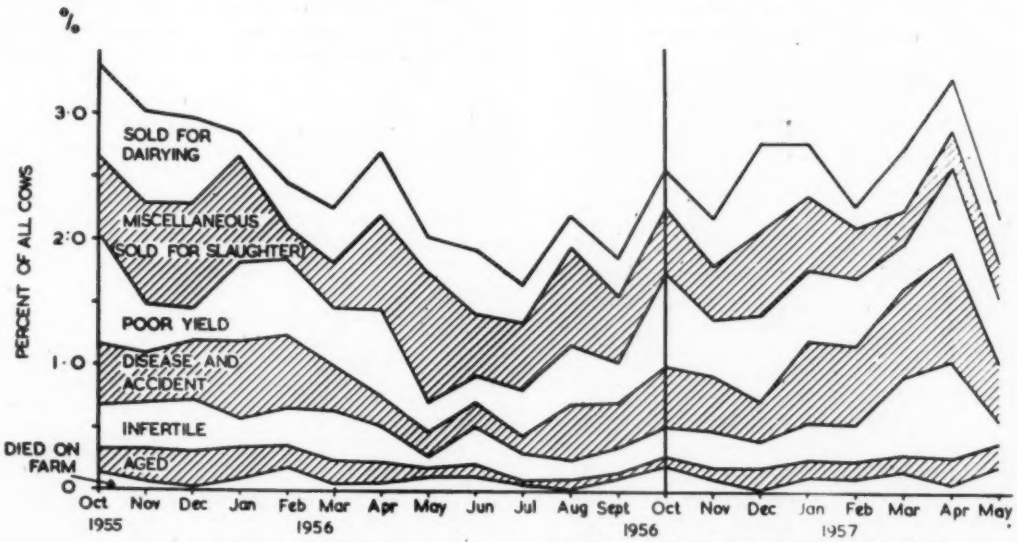

FIG. 1.—Monthly wastage and culling rates of in-milk and dry cows in P.M.R. herds, Oct. 1955.

TABLE III
ANIMALS CULLED DISTRIBUTED ACCORDING TO TIMES CALVED AND EXPRESSED AS PERCENTAGES OF TOTAL DISPOSALS

Reason for disposal	Times calved. Percentage of total disposals									Percentage of all cows
	1	2	3	4	5	6	6+	?	Total	
Died on farm	0·7	1·1	0·9	0·2	0·2	0·2	0·1	0·1	3·5	1·0
Aged	—	—	—	—	0·1	1·1	5·0	0·1	6·3	1·8
Infertile	1·7	1·7	2·6	1·5	1·7	0·9	0·8	0·1	11·0	3·2
Disease and accident ...	2·9	1·9	4·0	2·3	1·9	0·9	1·4	—	15·3	4·5
Poor Yield	2·6	4·6	6·0	2·8	1·6	0·7	0·7	0·1	19·1	5·6
Miscellaneous (for slaughter)	3·7	4·0	7·7	4·6	2·8	1·9	1·7	0·3	26·7	7·8
Sold for dairying	3·1	2·7	4·9	3·9	1·6	1·0	0·7	0·2	18·1	5·3
	14·7	16·0	26·1	15·3	9·9	6·7	10·4	0·9	100·0	29·2

be taken of the higher price of winter milk. For this reason there is usually a preponderance of heifers calving in the autumn and consequently farmers tend to cull more severely at this time of year, particularly if housing accommodation is limited. This tendency is probably emphasised by the farmer wishing to dispose of animals unlikely to milk throughout the winter when maintenance costs are high.

Analysis of Disposals according to Number of Times calved. The number of animals in each of the 7 wastage categories were classified according to the number of times each had calved. The results expressed as percentages of total disposals are shown in Table III.

The Table does not take into account that there are more first calvers than second, more second calvers than third and so on. Despite this the results clearly indicate the severe culling which takes place amongst third calvers for each of the main reasons for disposal. Many farmers consider it most profitable to dispose of animals at the end of the third lactation and the high wastage and culling rates in third calvers probably reflects a farmer's attitude rather than any weakness in third calvers as such. In view of the high costs of replacement heifers, and since mature cows on average produce more milk than young animals, differences in disposal values between third calvers and older cows would need to be of considerable magnitude to justify culling third calvers, simply because they are third calvers, as a herd policy.

Wastage and Culling of Heifer Replacements

For the purpose of this study heifers were defined as female dairy animals aged 6 or more months which had not calved for the first time. On the 1,020 farms supplying information on each sampling week, there were on average 9.1 heifers as defined above (see Table I). A total of 318 heifers died or were disposed of during the 12 sampling weeks and these were classified as for cows under:—

I. Death.
II. Infertile.
III. Disease and Accident.
IV. Miscellaneous (sold for slaughter).
V. Sold for Dairying.

TABLE IV
WASTAGE AND CULLING OF HEIFERS IN PRIVATE MILK RECORDS HERDS (1955–6)
(Stated as percentage of all heifers in P.M.R. herds)

Reason for disposal	Per cent.
Death (not destroyed)	0·3
Infertile	3·8
Disease and accident	1·1
Sold for slaughter	2·7
	7·9
Sold for dairying	6·9
	14·8

Results are shown in Table IV.

Deaths and disposals accounted for 14.8 per cent. of all heifers annually, but 6.9 per cent. are sold for dairying so that losses of heifers to the industry (true wastage) amounted to 7.9 per cent.

Deaths (not destroyed): 0.3 per cent. of all heifers. Accidents were responsible for most losses but among the remaining causes of death no single disease appeared to be of particular significance.

Infertile: 3.8 per cent. of all heifers. It was not possible to classify the different types of infertility. Considered as a single reason for disposal it is an important source of loss of potential replacement animals from the dairy industry.

Disease and Accident: 1.1 per cent. of all heifers. The relative importance of the reasons for disposal of animals in this category was: TB. reactors 0.6 per cent., " dry-cow " mastitis 0.2 per cent., Johne's disease 0.1 per cent., others 0.2 per cent.

Sold for Slaughter: 2.7 per cent. of all heifers. Fat animals accounted for 0.4 per cent., poor conformation 0.3 per cent., while 2.0 per cent. were known to be sold for meat, in many cases because the farmer required capital, in others because beef prices were too attractive to neglect.

Sold for Dairying: 6.9 per cent. of all heifers. These were animals known to have gone to other herds and 6.6 per cent. of the cases represented genuine surplus. A further 0.2 per cent. were sold because they were from poor dams and 0.1 per cent. because of poor dairy conformation.

Seasonal Culling Trends, 1955-6. Fig. 2 shows the culling rates in each month and the contribution of the 5 categories of disposal.

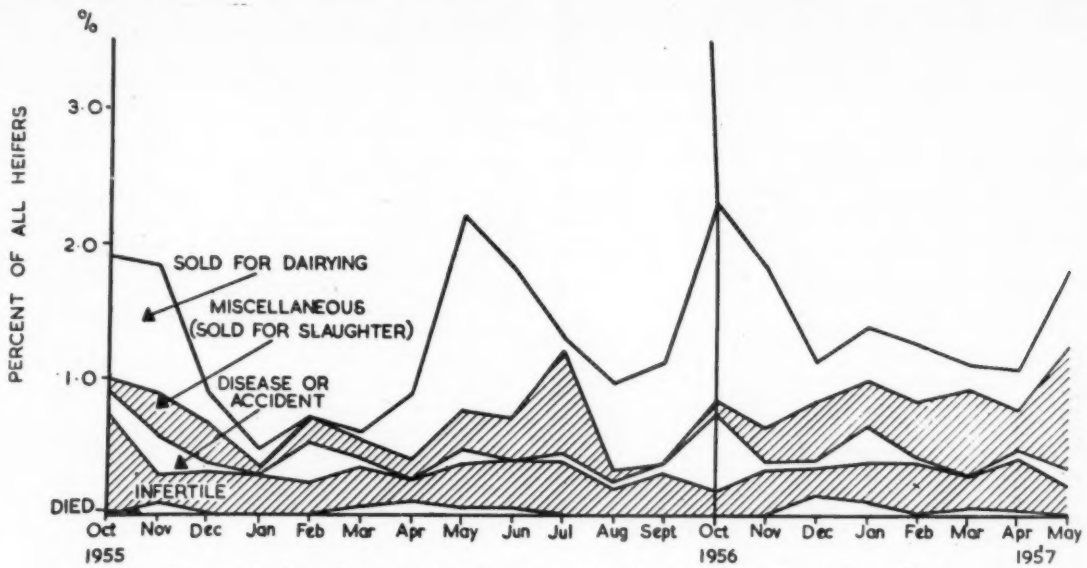

FIG. 2.—Monthly Wastage and Culling Rates of Heifers in P.M.R. Herds, Oct. 1955.

Results to date indicate 2 distinct periods when disposals are most frequent—the first in October and November and the second in May and June. These 2 peaks are due to marked increases in the numbers of heifers sold for dairying. The remaining disposal categories remain relatively constant from month to month although when beef prices are attractive the number of heifers originally intended for dairying which are sold for meat increases appreciably.

Acknowledgments.—We wish to acknowledge the excellent co-operation of members of the Private Milk Records Scheme, the fieldsmen who collected all the information, and the helpful advice given by Dr. F. W. Withers, Ministry of Agriculture, Fisheries and Food, Veterinary Laboratory, New Haw, Weybridge.

References

WITHERS, F. W. (1955). *Vet. Rec.* **67**. 605.
———. (1957). *Ibid.* **69**. 446.

STERILITY DANGER FROM RADIOACTIVITY

A press notice from the Ministry of Agriculture states that questions have been asked about the possibility that the accident at Windscale may have caused, or may cause in the future, sterility to farm animals. The matter has been referred to the Agricultural Research Council and to the Animal Health Division. Their advice is that much research into radioactivity as a possible cause of sterility in farm animals has been conducted in the United States. This evidence confirms that there are no grounds at all for supposing that farm animals anywhere within the controlled area can have received a dosage of radioactivity which could cause sterility.

"MICROSCOPIUM"

The original "Microscopium" was written in Dutch by Dr. Maria Rooseboom of Leiden University, and was commissioned by Pfizer-Holland.

On October 16th, a reception sponsored by the Anglo-Netherlands Society was held at the English-speaking Union and many leading personalities in the medical and scientific world attended. Specially bound copies of "Microscopium" were presented to leading scientists by Sir Nevile Butler, formerly H.M. Ambassador to the Netherlands, who received the guests with Dr. Maria Rooseboom. Among those thus presented was Professor Lovell, who received a copy on behalf of the Royal College of Veterinary Surgeons, as shown in photograph.

The English translation has been beautifully produced, and is an admirable example of the high quality of current Dutch book production.

An Outbreak of *Salmonella dublin* Infection in Goats

BY
E. A. GIBSON
Veterinary Investigation Centre, Cambridge

SUMMARY.—An outbreak of S. dublin *infection in goats is described. The epidemiological evidence indicated that the infection was contracted from the dairy herd with which the goats were kept. It is suggested that goats may differ from cattle in their serological response to* S. dublin *infection.*

Introduction

SALMONELLA dublin is primarily a pathogen of cattle (Buxton, 1957) although foxes and other fur-bearing animals constitute a secondary reservoir of infection in some countries (Edwards, Bruner & Moran, 1948; Momberg-Jorgensen, 1949). The infection is occasionally found in other host species, and Buxton (*op. cit.*), in a list that does not claim to be comprehensive, gives references to the isolation of *S. dublin* from 9 species in addition to cattle, foxes, and mink.

S. dublin infection in goats has been reported from Great Britain by Levi (1949), who described a spontaneous outbreak in young goats at a laboratory, and from Indonesia by Utojo (1954) who isolated the organism from the colic lymph node of a goat during a bacteriological survey of abattoir material.

The present report describes a field outbreak encountered in April, 1951, during an investigation of bovine salmonellosis on a dairy farm in Carmarthenshire.

Materials and Methods

Rectal swabs were used to collect faeces samples from both cattle and goats. The swabs were incubated over-night in about 10 ml. of selenite F medium (Hobbs & Allison, 1945) and subcultured on to plates of desoxycholate-citrate-agar ("D.C.A.") (Hynes, 1942). In some instances the selenite F medium was also subcultured after incubation at 37° C. for 48 hours and 7 days. The D.C.A. plates were examined after incubation at 37° C. for 24 and 48 hours, when colonies that had failed to ferment lactose were tested with diagnostic sera obtained from the Standards Laboratory, Colindale.

Blood serum agglutination tests were prepared with 2-fold serial dilutions of sera in normal saline, commencing at 1:5 and in volumes of 0.5 ml.

To these were added equal volumes of flagellar or somatic antigen prepared from a stock strain of *S. dublin* by the methods described by Field (1948). The tests were read after incubation at 37° C. for 18 hours.

History of Bovine Salmonellosis on this Farm

In March, 1950, 3 adult goats, 2 females and a which died after showing signs of clinical salmonellosis (Field, personal communication). Two further cases were confirmed in 1948, but one of these recovered. Another fatal case occurred on March 10th, 1951, about 3 weeks before the outbreak in goats commenced.

The strains of *S. dublin* isolated from the fourth case and from the recovered cow both belonged to phage type 4. The latter finding indicates that this phage type had probably been present in this herd since 1948.

On March 27th, 1951, an examination of the faeces of the 35 cows and their 15 followers showed that the recovered cow, 3 other cows, and 2 calves (Nos. 51 and 53) were exereting *S. dublin* type 4 in the faeces.

During the following 5 months *S. dublin* type 4 was

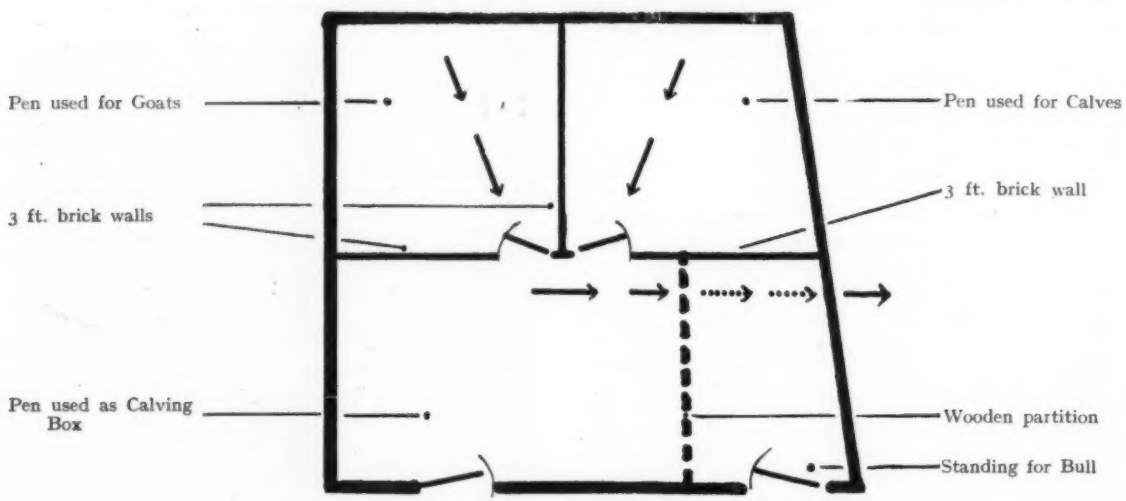

DIAGRAM OF CALF PENS.—The arrows denote drainage.

TABLE I

AGGLUTINATION TITRES AND FAECAL EXCRETION OF *S. dublin* IN FIVE INFECTED GOATS

Reference number of goat	G 1		G 2		G 3		G 4		G 6	
Description	Adult female		Female kid, daughter of G 1		Adult female		Male kid, son of G 3		Male kid, purchased	
Age on April 1st (date of death of kid G 5)	4 years		9 days		2 years		4 days		2 weeks	
Times at which samples were taken following the death of G 5	Faeces	Blood	Faeces	Blood	Faeces	Blood	Faeces	Blood	Faeces	Blood
5 days	Neg.	H 1 : 20 O 1 : 20	Neg.	—	Neg.	H 1 : 80 O 1 : 10	Neg.	—	Neg.	—
7 „	—	—	Neg.	—	—	—	Neg.	—	Neg.	—
12 „	—	—	*S.d.*	—	—	—	Neg.	—	Neg.	—
13 „	—	—	*S.d.*	—	—	—	Neg.	—	Neg.	—
7 weeks	Neg.*	H 1 : 640 O 1 : 320	Neg.*	H 1 : 10,240 O 1 : 10	Neg.*	—	—	—	Neg.*	H 1 : 5,120 O 1 : 10
9½ „	Neg.*	H 1 : 640 O 1 : 80	Neg.*	H 1 : 10,240 O 1 : 10	Neg.*	H 1 : 640 O 1 : 20	Neg.*	H 1 : 20,480 O 1 : 20	Neg.*	H 1 : 640 O 1 : 10
15 „	Neg.†	H 1 : 640 O 1 : 40	Neg.†	H 1 : 1,280 O 1 : 10	Neg.†	H 1 : 1,280 O 1 : 10	Neg.†	H 1 : 20,480 O 1 : 20	Neg.†	H 1 : 320 O 1 : 10
19 „	Neg.	H 1 : 640 O 1 : 40	Neg.†	H 1 : 640 O 1 : 10	Neg.†	H 1 : 640 O 1 : 10	Neg.†	H 1 : 5,120 O 1 : 20	Neg.†	H 1 : 160 O 1 : 10
24 „	Neg.†	H 1 : 640 O 1 : 20	Neg.†	H 1 : 320 O 1 : 10	Neg.†	H 1 : 640 O 1 : 20	Neg.†	H 1 : 1,280 O 1 : 20	Neg.†	H 1 : 80 O 1 : 20
33 „	Neg.†	H 1 : 640 O 1 : 40	Neg.†	H 1 : 320 O 1 : 10	Neg.†	H 1 : 640 O 1 : 10	Neg.†	H 1 : 640 O 1 : 20	Neg.†	H 1 : 80 O 1 : 10

KEY : H Flagellar titre. *S.d. S. dublin* isolated.
O Somatic titre. Neg. No salmonella organisms isolated.
* Selenite F medium subcultured after incubation for 24 and 48 hours.
† Selenite F medium subcultured after incubation for 24 hours, 48 hours and 7 days.
— Not examined.

TABLE II

AGGLUTINATION TITRES AND FAECAL EXCRETION OF *S. dublin* IN THREE INFECTED CALVES

Reference number of calf	51		52		53	
Age when first examined on March 27th	10 days		7 days		2 days	
	Faeces	Blood	Faeces	Blood	Faeces	Blood
March 27th	*S.d.*	—	Neg.	—	*S.d.*	—
April 4th	Neg.	H 1 : 10 O Neg.	Neg.	H Neg. O Neg.	*S.d.*	H Neg. O Neg.
„ 6th	Neg.	—	Neg.	—	Neg.	—
„ 8th	Neg.	—	Neg.	—	*S.d.*	—
„ 13th	*S.d.*	—	Neg.	—	*S.d.*	—
„ 14th	*S.d.*	—*	*S.d.*	—	*S.d.*	—
„ 17th	Neg.	—	Neg.	—	Neg.	—
May 4th	Neg.	H Neg. O Neg.	Neg.	H 1 : 80 O Neg.	Neg.	H Neg. O 1 : 20

KEY AS FOR TABLE I : Neg. titres were negative at 1 : 10. * Symptoms (diarrhoea and pyrexia) of clinical salmonellosis.

isolated from 2 younger calves and, on 6 occasions, from a stream that received drainage from the farm buildings.

History of the Outbreak in Goats

In March, 1950, 3 adult goats, 2 females and a male, were purchased from a neighbour and kept on tether, away from the dairy herd, to keep down the rough growth. The male died in February, 1951, after losing condition, but the cause of death was not ascertained.

On March 21st, 1951, both females were brought into 1 of 3 calf pens for kidding (Fig. 1). Calves kept in these pens the preceding winter had suffered from "calf scours," and some had died. These losses had not been investigated, but the herd history suggests that they were possibly due to *S. dublin* infection.

When the goats were brought in, one adjacent pen contained 2 calves (Nos. 51 and 52). Examination on March 27th showed that the older calf was excreting *S. dublin*, as was a third calf that had been put with the others (see Table II). Faeces samples from a bull kept in the same building were consistently negative for salmonella organisms.

One goat (G1) kidded on March 23rd, and the other (G3) produced twins on the 28th. All 3 kids appeared to thrive normally until April 1st, when 1 twin showed abdominal straining and leg weakness. Four hours later it was found dead.

Post-mortem examination showed that both lungs were congested. The liver substance appeared normal, but the bile was scanty, turbid, and orange-yellow. The surface of both kidneys showed numerous petechiae, and the rectal faeces were yellow and pasty. Cultural examination showed the presence of *S. dublin* type 4 as a septicaemia.

During the following 8 months, samples were taken at intervals from all the surviving goats, including a kid (G6) which had been purchased to replace the dead one. All 5 animals appeared healthy throughout this period.

The results of these examinations are shown in Table I. *S. dublin* type 4 was isolated from only 1 goat, but all 5 developed significant levels of flagellar antibodies. One adult female showed a significant somatic titre, but the data obtained suggested that the other 4 animals showed little or no production of somatic agglutinins.

Scrapings of calf faeces taken from the walls of the goat-pen on April 6th failed to yield salmonella organisms.

Discussion

Although Levi (1949) suggested that some adult goats might be carriers of *S. dublin* there is little doubt that in the present outbreak the infection was contracted from the dairy herd.

It is significant that all the strains submitted to phage-typing belonged to type 4. This type is relatively uncommon, comprising only 9.5 per cent. of the 306 strains examined by Smith (1951). The isolation of this type from both species therefore strongly supported the view that their infections were epidemiologically related.

As stated above, *S. dublin* type 4 infection was probably present in the dairy herd in 1948, whereas the increase in flagellar agglutinins shown by the adult goats indicated that they probably became infected at about the same time as their offspring.

This is in keeping with the history that they were previously kept on an outlying part of the farm, away from the dairy herd, with no access to the stream which received the drainage of the farm buildings and from which *S. dublin* type 4 was later recovered.

Although phage-typing provided valuable epidemiological evidence in the present instance it should be noted that it is usually of limited value in the investigation of *S. dublin* infection, due to the fact that the majority of strains belong to type 1, this type comprising 66.9 per cent. of the 306 strains examined by Smith (1951).

In view of the high incidence of infection in the dairy herd, which was housed at the time, the goats may have become infected by various means. The most likely source was the calves in the adjacent pen, 2 of which (Nos. 51 and 53) were shown to be excreting *S. dublin* the day before the twin goats were born.

Although their number are too few to support a definite conclusion, the serological response to *S. dublin* infection shown by these 5 goats appeared to differ from that usually shown by cattle.

Thus, in contrast to the variable flagellar agglutinin response usually given by calves (Field, 1948), and the very poor response shown by the 3 calves in the adjacent pen (Table II), all 3 young goats showed a marked increase in flagellar agglutinins. These findings resemble those of Levi (1949) who studied the agglutinin response of 8 naturally-infected young goats and reported that all 8 developed flagellar titres of from 1:320 to 1:20,480.

The poor somatic agglutinin response shown by the 3 young goats was similar to that usually shown by young calves (Field, 1948).

The response shown by the 2 adult goats also differed from that shown by cattle. Adult cattle with flagellar titres of 1:640 are invariably found to be faecal excretors of *S. dublin*, but the rectal swabs taken from the goats on 7 occasions gave consistently negative results.

Acknowledgments.—I wish to thank Dr. Joan Taylor, of the Salmonella Reference Laboratory, for confirming the identity of the various strains of *S. dublin*, and Dr. H. Williams Smith for phage-typing them.

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"CAN ARTIFICIAL SOMATIC MUTATIONS BE PRODUCED IN BIRDS?"

We are indebted to a correspondent for the following note on work recently carried out by a group of French scientists: Mm. Jaques Benoit, Pierre Leroy, Mme. Colette Vendrely, and M. Roger Vendrely.

Desoxyribonucleic acid (DNA) was prepared from the nuclei of testicular tissue and from erythrocytes of donor Khaki Campbell ducks. This material was injected intraperitoneally into Pekin ducks and drakes starting when the animals were 8 days old. Nine ducks were used and they were injected with DNA weekly for 19 weeks. The 3 drakes used were given 5 injections over one month.

About 9 months afterwards 8 of the ducks and one drake showed marked deviation from the Pekin type having developed characteristics much more like the donor Khaki Campbell breed. These changes included modification of the beak colour, the nature and disposition of feathering, conformation of the head, and size of the body. The artificial "hybrids" differ very much from the normally produced cross between Khaki Campbell and Pekin which reverts to the primitive Rouen type of duck.

The mutations produced by the DNA injections behave quite normally, the ducks laying eggs regularly and the drake showing normal sexual activity.

The authors suggest that the injection of "foreign" DNA has a very great potential value in providing a means of producing artificial mutations without using germ plasm.

Fixation of Mandibular Fractures in the Dog and Cat by Transfixation Pinning

BY
DONALD D. LAWSON
Glasgow University Veterinary School

SUMMARY.—(1) *The literature relating to methods of fixation of mandibular fracture in the dog and cat is discussed.*

(2) *The regional anatomy of the mandible and the muscles of mastication are discussed in so far as they affect the fixation of mandibular fractures.*

(3) *The method of transfixation pinning of the mandible is described and its mechanics discussed.*

TRAUMATIC mandibular fractures occur not infrequently in the dog and cat and the fact that the management of these fractures has presented difficulty is reflected by the many methods of treatment which have been described. The procedures include bandaging of the dog's jaw or plaster bandage; wiring of the teeth; use of plates and screws; longitudinal intramedullary pins, and Kirschner-Ehmer splints. Each of these methods is of value for certain fractures, but none is applicable to all cases which are encountered.

(1) *Bandaging of the Mouth* (McCunn, 1953; Zepp, 1928) or the use of a muzzle, either alone (McCunn, 1953) or with plaster cast moulded to fit round the horizontal rami of the mandible (Sanders, 1932. Johnston & Farquharson, 1939) is of limited value especially in short-nosed dogs where the upper and lower dental arcades do not come into normal apposition. These methods also give rise to feeding difficulties and damage to the skin of the face may result from pressure.

(2) *Wiring of the teeth* may be carried out between the lower canines with the wire exposed in the buccal cavity (McCunn, 1953), but this tends to cause some instability due to the fixation being entirely above the body of the bone; or it may be carried round the outer gingival margin from one side to the other (Anonymous, 1929) or stitched through between the outer surface of both rami and the lip so that it completely encircles the bone (Blackburn, 1932; Zepp, 1928); in both of these methods there is always a considerable degree of irritation to the patient who paws continually at the mouth. Wiring of this type is useful only for fractures of the symphysis or close to it.

(3) *Plate and screw fixation* (Schunick & Rickman, 1940) requires specially shaped plates, which must be small enough to lie under the reflected gum. These plates are too large to be used in the cat and cannot be used in young dogs because of interference with the developing teeth by the screws.

(4) *With Kirschner-Ehmer or Stader splints* (Armistead, 1947; Brinker, 1949) the pin units may be difficult to apply because of the small size of one of the fracture fragments.

(5) *Longitudinal intramedullary pins* (Brinker 1948 and 1949; Knowles, 1949) are difficult to apply and do not give effective fixation because the medullary canal of the horizontal ramus is not circular on cross section (*v.* Fig. 1).

It is the purpose of this communication to describe the use of transfixation pinning of the mandible and to discuss the relevant regional anatomical features. In 1939 Johnston and Farquharson described the use of a transfixing Kirschner wire in the treatment of fractures of the body of the mandible, where the fractures were either close to or actually through the symphysis. This work was later referred to by Brinker in 1949, but neither of these papers expanded on the theme or described the use of this technique for fractures occurring behind the level of the canines.

Regional Anatomy

The mandible consists of two symmetrical halves which are joined anteriorly at the mandibular symphysis so that the angle between them is fixed. This symphysis never becomes completely fused but, despite this, is a strong union and is capable of carrying considerable strain. Each half mandible is composed of a horizontal ramus which carries the teeth and vertical ramus which carries the articular process. The horizontal ramus is flattened from side to side so that the well developed medial and lateral cortices are nearly parallel to each other, being separated by a medullary canal which is oval on cross section (Fig. 1). The tooth roots pass rather more than half-way down into the horizontal ramus and below them lies the medullary canal proper which carries the mandibular vessels and nerves (Fig. 2).

The vertical ramus of the mandible is much more laterally compressed and has no proper medullary canal. On its posterior edge are 3 processes: the upper coronoid process on to which the temporalis muscles are attached, the central condyloid process which forms the articular surface and the small angular process at the lower edge. The tempero-mandibular joints are transversely elongated so that, when the mandible is intact they permit movement in the vertical plane only, there being only minimal lateral movement possible.

The muscles of mastication are divisable into two groups according to their action: (1) those which close the mouth—the temporalis, the masseter and the pterygoideus. These muscles insert into the coronoid process; the masseteric fossa of the lateral surface of the vertical ramus; and the ventral border and angle on the medial side of the mandible respectively, and (2) those which open the mouth—the digastricus muscles. These muscles run downward and forward from the jugular process on the postero-ventral surface of the skull to the medial ventral border of the mandible as far forward as the last molar teeth.

Surgical Considerations

Single fracture of the mandible can occur at any part of the bone and from the point of surgical treatment the fracture sites can be divided into two main groups: I. Fracture of the Vertical Ramus, and II. Fracture of the Horizontal Ramus.

1. Fracture of the Vertical Ramus

Fractures of the vertical ramus or of the angle of the mandible behind the last molar tooth are numerically less common, but have been the subject of special mention by previous writers (Armistead, 1947) who have emphasised the difficulty of applying treatment. Because of the points of insertion of the muscles of mastication and their actions, fixation of these fractures, however, is unnecessary. To be more specific, if a fracture occurs at the angle of the mandible, it is surrounded on both sides by muscle mass which tend to hold it in reasonable alignment. On closing the jaw the action of the masseter and pterygoidus muscles tends to draw the fractured faces into apposition. On opening the mouth, the diagastricus muscle, which is inserted just anterior to the fracture, will again tend to hold the fractured faces of bone together. Thus active measures for the fixation of such a fracture is unnecessary.

A total of 4 cases of this type have been encountered (3 dogs and 1 cat) and in each case only transient difficulty in mastication was noted, the dogs returned to normal feeding within approximately 4 days and healing of the fracture occurred spontaneously.

II. Fracture of the Horizontal Ramus

Fractures of the horizontal ramus at any point anterior to the last molar tooth, which is numerically the more common fracture, may be treated by the use of a single transfixing metal pin and here again use is made of various anatomical features. The pin is inserted posterior to the fracture line so as to act as a temporary bridge ("symphysis") between the fractured horizontal ramus and its non-fractured counterpart. It is inserted so that it lies at right angles to the median plane of the head and penetrates both cortices of both rami. Because of the latter fact the pin cannot deviate from the line in which it has been inserted. If only one cortex is penetrated, the pin can swivel about this point, but when both are penetrated the bone to pin relationship is fixed except along the long axis of the pin. This affects also the relationship of the rami to each other, as if the pin is inserted with the fracture properly reduced, the two rami must of necessity maintain the correct alignment to each other because—(1) both must move together on the vertical plane, and (2) neither can be deflected on the horizontal plane without affecting the other, because the pin penetrates the cortices of each ramus at an angle of some 15 to 20 degrees and so lateral movement of a ramus is possible only along the long axis of the pin, but even this movement is not possible because of the posterior position of the tempero-mandibular joint which serves as a second point of fixation.

Thus the relationship of the horizontal rami to each other is controlled in both planes of potential displacement, and since the anterior segment of the fractured ramus is firmly attached to the non-fractured ramus through the symphysis, the fracture itself is adequately immobilised.

Operative Technique

The pin is inserted using hand drilling only, a simple Jacob-type chuck being used, with most of the pin projecting from the chuck so as to avoid the necessity of stopping when the pin is partially inserted and readjusting the chuck, since this can be a cause of considerable annoyance. It the pin has a threaded tip the initial hole is made by alternate quarter turns of the chuck until the thread is engaged and then this is followed by normal right hand screwing. This screwing of the pin is only necessary until the short threaded portion is in the intermandibular space, when the plain shaft is in the bone, and again when the thread engages the second ramus.

The following description gives all the steps of the operation in sequence.

The patient is laid out with the non-fractured side uppermost and the relationship of the fracture to the teeth noted. A suitable point for transfixation is selected, posterior to the level of the fracture and in such a position that the tooth roots will not be encountered. The skin overlying this area is shaved and disinfected and a stab incision is made level with the mid point of the depth of the mandible. The pin is drilled through the lateral cortex, and so as to make certain that the point of the pin does not slide away from the selected position, this hole is drilled with the long axis of the pin maintained at right angles to the bone surface. Once this cortex has been penetrated the direction of advance of the pin is altered so that it follows as exactly as possible a line which is at right angles to the median plane of the head.

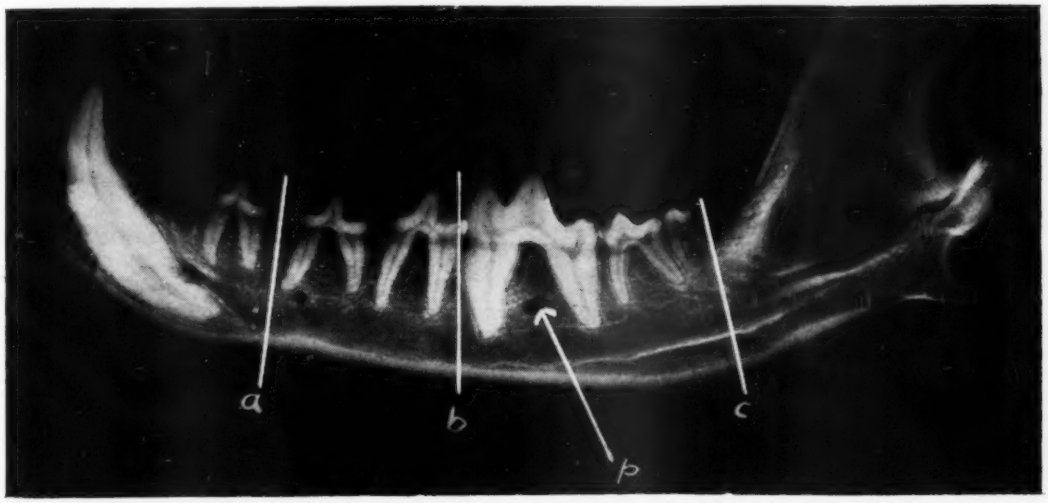
The medial cortex of the non-fractured ramus is then penetrated, and the fracture must now be correctly aligned, the realignment being assisted in many cases by causing the upper and lower arcades of teeth to fit together. The pin is then passed across the sublingual space in the soft intermandibular tissues until it comes in contact with the medial cortex of the fractured ramus. The head is held with the anterior segment of the fracture projecting over the edge of the table, and by grasping this segment and holding it so that it cannot move in relation to the table top, it is relatively simple to drill the pin through both cortices of the fractured side without disturbing the fracture. When the outer cortex has been penetrated the point of the pin can be felt in the subcutaneous tissues, posterior to the fracture. The pin is made to pass at all points through the bone and soft tissues, and at no point does it penetrate the mucous membrane. If a pin of suitable length has been selected it is possible to draw the skin over its blunt end and to suture the stab incision which was made at the point of insertion. If, however, the pin is too long to permit the skin to be drawn over it, it is inadvisable to attempt cutting the pin after it has been inserted as this would result in loosening the grip of the pin on the bone.

DONALD D. LAWSON.—FIXATION OF MANDIBULAR FRACTURES IN THE DOG AND CAT BY TRANSFIXATION PINNING.

FIG. 1.—Transverse section of the canine mandible at (a) second premolar, (b) fifth premolar, (c) last molar. This shows the ovoid shape of the medullary canal and the thickness of the cortices and the variation in distance between them.
(right)

FIG. 2.—Lateral radiograph of a mandible. This shows the distribution of the tooth roots in the bone and the point (p) at which the pin was inserted in the specimen (Fig. 3). It also shows the lines of section of the mandible in Fig. 1 (a, b, & c).
(middle)

FIG. 3.—Dorso-ventral radiograph of a mandible. This shows fixation of a fracture (F) by a single transfixation pin, showing that the long axis of the pin does *not* form a right angle with the cortices of the rami.
(bottom)



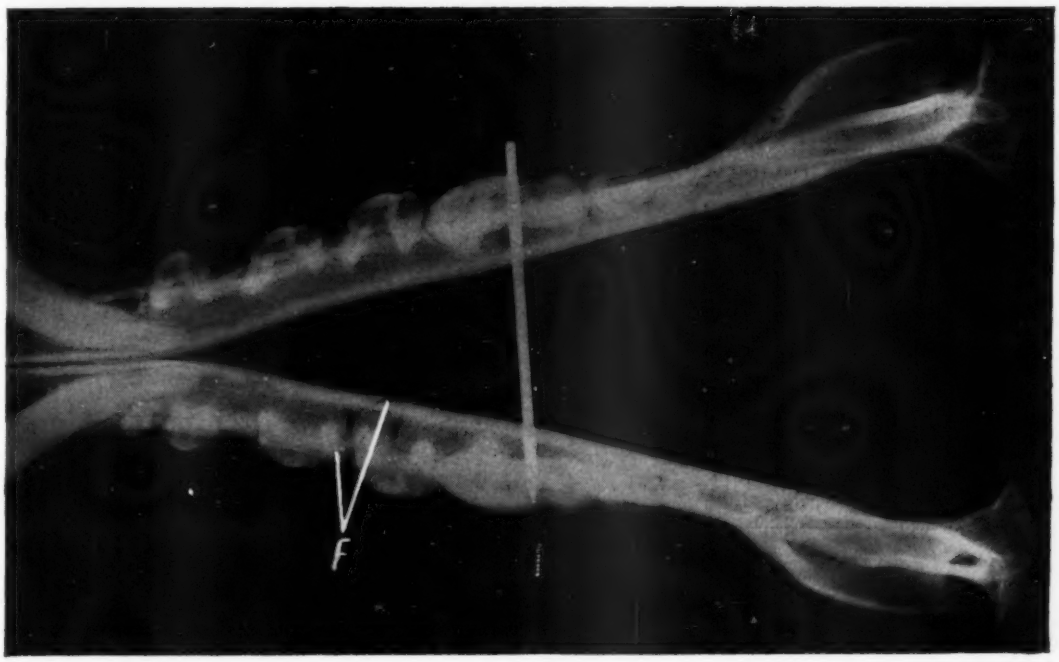


FIG. 4.—Dorso-ventral radiograph of head of terrier. This shows a fracture of the left horizontal ramus of the mandible.

FIG. 5.—Dorso-ventral radiograph of terrier's head. This shows fixation of the fractured mandible by a single transfixing pin.

FIG. 6.—Dorso-ventral radiograph of terrier's head. This shows the healed fracture of the left horizontal ramus of the mandible four weeks after removal of the pin.

(right)

FIG. 7.—Lateral radiograph of cat's head. This shows a dislocation of the right temporomandibular joint and a disparity between the level of the two horizontal rami, despite the fact that the head is in the true lateral position.

(below

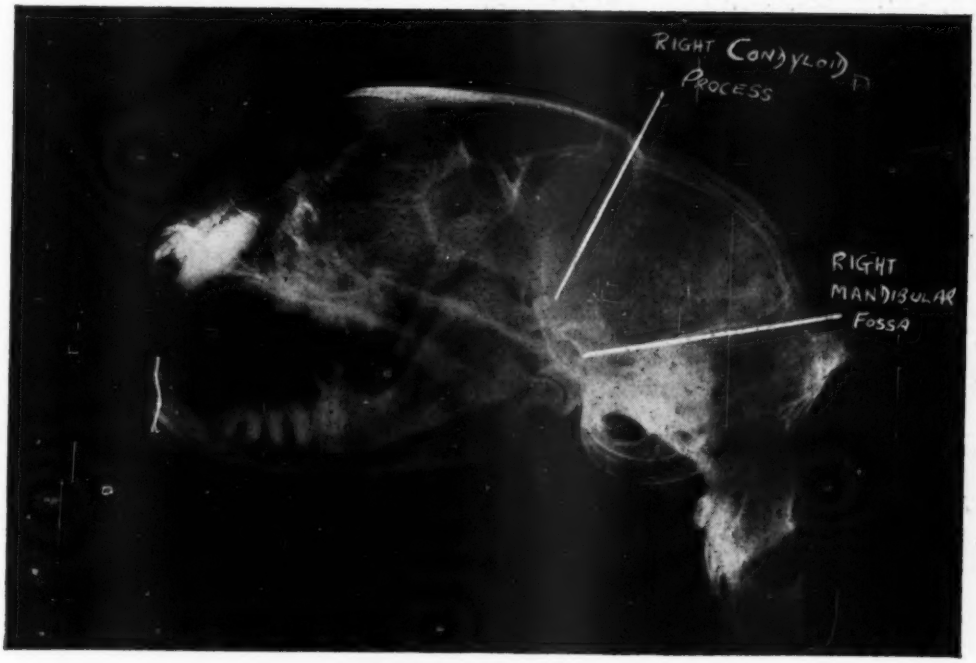


FIG. 8.—Dorso-ventral radiograph of cat's head. This shows a right tempero-mandibular luxation and symphyseal separation of the mandible.

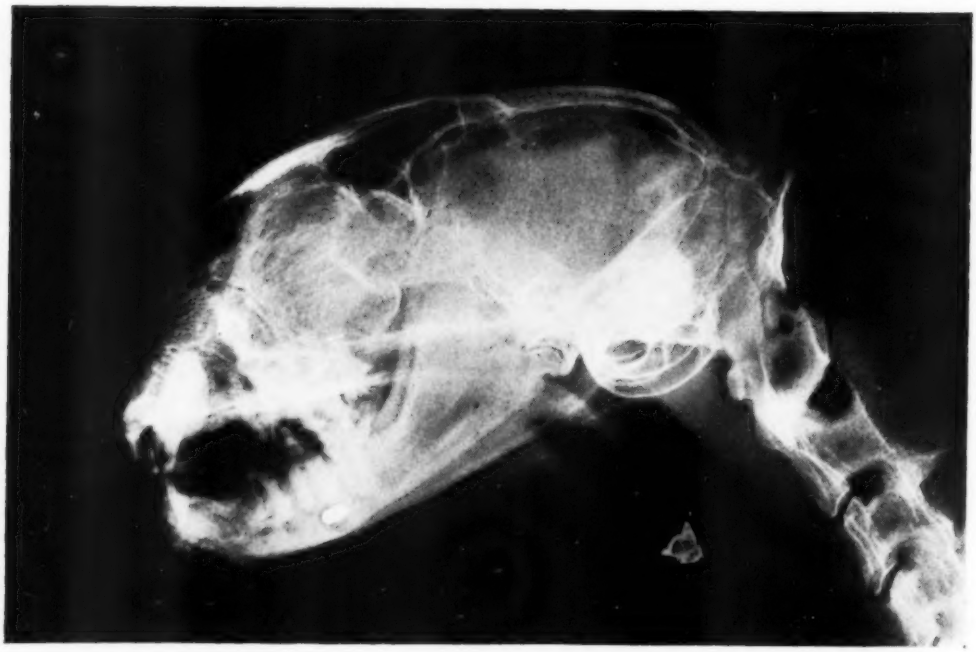


FIG. 9.—Lateral radiograph of cat's head. This shows the corrected fracture and dislocation. Fixed by one transfixation.

In all cases 18/8 stainless steel pins have been employed since this material is well tolerated by the animals' tissues. The pin size that has been found most suitable is 3/32 inches diameter, the length of the pin required is largely dictated by the width of the intermandibular space at the point which is to be transfixed. In most instances the pin has had a thread cut in the small portion immediately following the trochar point and it is believed that this helps to increase the stability of the fixation. When the pin has been inserted in this manner the fractured mandible will be held firmly in alignment and the patient can be permitted to eat solid food almost immediately. A noticeable feature is that the animals exhibit no discomfort whatever after a few days and, indeed, appear to be unaware of the presence of the pin. The animals will eat normally without any apparent difficulty or pain.

During the past 5 years 32 cases (23 dogs, 9 cats) of mandibular fracture have been successfully treated by this method here at the University Veterinary Hospital. All of these cases had compound, single fractures of the mandible, either at the symphysis (7 dogs, 2 cats) or of the horizontal ramus (16 dogs, 7 cats).

Radiography is not undertaken as a routine since these fractures are easily examined once the animal has been anaesthetised and the exact nature is readily determined by direct inspection.

Figs. 4, 5 and 6 show X-ray plates of an old mongrel Terrier with a fracture of the horizontal ramus in a nearly edentulous mandible. Figs. 7, 8, 9 and 10 show a case of a cat with a symphyseal fracture and a tempero-mandibular luxation.

In all cases penicillin is given to counteract infection —which occurs in *all* cases—because the fracture is compound.

In a few cases the gum had been stripped from the bone and required to be sutured. The pin support was found to be necessary for a period of approximately 6 weeks in both dogs and cats.

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The 1957 Congress Proceedings

On December 7th it is proposed to publish the full scientific proceedings of the 1957 Congress as a special additional number of THE VETERINARY RECORD. As this will entail a large and costly volume the number of spare copies will be limited. Organisations or individuals who are likely to require extra copies (price 12s. 6d.) are asked to notify the B.V.A. not later than November 11th.

Current Literature

ABSTRACTS

Copper as a Nutritional Hazard on the Farm. O'MOORE, L. B. (1956). *Irish Vet. J.* **10.** 225–6.

Chronic copper poisoning in sheep is well recognised, but cattle do not accumulate copper in their tissues to the same extent as sheep and there are few reports of the condition in the bovine. A case of copper poisoning in young calves is described in which the source of the metal was copper sulphate solution sprayed some 8 to 12 weeks previously on the walls of the calf house as a ringworm-control measure. Three calves in a group of nine died; symptoms, *post-mortem* findings and liver copper levels are given. The author stresses, also, the danger of copper intoxication from over-supplemented diets, which is well illustrated by the recent account of chronic copper poisoning in young calves by Shand & Lewis (1957): *Vet. Rec.* **69** (25). 618–21 (22.6.57).

C. A. E. B.

Infectious Bovine Rhinotracheitis — A Newly Recognised Virus Disease of Cattle. MCKERCHER, D. G., *et al.* (1957). *Amer. J. Vet. Res.* **18.** 246.

The authors describe a virus disease (IBR) occurring in California and other states bearing a resemblance to "mucosal disease" found in the U.S.A. and in this country. The disease, which may attain epizootic proportions, occurs in two forms—a mild type in dairy cattle and a severe type in beef cattle. The affection which is confined to the respiratory tract, commences with a febrile reaction, salivation, congestion of the nasal mucosa with nasal discharge; animals in the advanced stage may develop marked emphysema with respiratory distress. The principal lesions are congestion of the nasal mucosa, slight exudate in mild cases and a copious fibrino-purulent one in the more advanced stages.

Infection could be set up experimentally in calves by spraying nasal washings from natural cases into the nasal cavity but the virus was not present in other tissues. It was possible to demonstrate by cross-protection tests carried out in calves that the infective agent responsible for the respiratory disease of cattle in California and Colorado was identical. The presence of virus only in nasal secretion differentiates the condition described from that in the mucosal disease complex where, in addition, lesions are distributed mainly as ulcerative foci in the alimentary tract. S. T. E.

Distemper in Dogs. II. The Response to Vaccination. GTT, R. L., *et al.* (1957). *Am. J. vet. Res.* **18.** 375–81.

In this article, the second report in this series, the authors describe a number of experiments carried out in foxes, ferrets and dogs, in which they attempt to determine the factors affecting either or both the serum neutralising antibody response, and the resistance to challenge with virulent distemper virus, using the Snyder Hill virus.

Their observations on the age at which young puppies should be actively immunised are interesting, particularly in view of the generally accepted practice in this country of using the egg-adapted vaccine at about 12 weeks old. The authors state that whereas pups of immune dams could be immunised when vaccinated at

14 days old, those from hyperimmunised dams could not be protected by vaccination at 42 days old. From this it might be hypothesised that pups from distemper-susceptible dams could be successfully immunised with egg-adapted virus when a few days old. But the authors warn practitioners that such susceptible bitches are unlikely to be encountered.

Other conclusions reached were that the egg-adapted virus stimulates a rise in serum-neutralising antibody, which reaches its peak at approximately 4 to 6 weeks and thereafter steadily declines. High levels of neutralising antibody were maintained in laboratory animals by repeated contact with distemper-infected animals.

The importance of using egg-adapted virus that is living at the time of vaccination is also stressed, and an experiment is described in which 60 ferrets were immunised with virus that was thought to be alive, but subsequently proved to have been dead at the time of vaccination. All 60 ferrets succumbed to a later challenge. This factor should be borne in mind, and emphasises the fact that practitioners should strictly follow the manufacturers' instructions regarding the storage of the egg-adapted virus. J. S. J. L.

BOOK REVIEWS

Population Study of Penguins. By L. E. RICHDALE. Oxford University Press. 1957. 42s.

Mr. Richdale's second book is a population analysis of his 18-year study of the yellow-eyed penguin in Southern New Zealand. The life cycle is examined, and each stage is discussed at length, well supported by data showing its influence on the survival of the community.

In an ecological study of this kind, although evidence is readily available, it is a far more difficult matter to correlate the various facts and to produce a coherent as well as an accurate picture of bird life in the wild state. This the author has competently accomplished and Mr. Richdale is to be congratulated on the workmanlike presentation of his book, which I am certain will prove an oft-consulted work for those engaged on similar studies. References have been carefully sieved for reliability, definitions are clearly presented at the beginning of the book, and technical methods are well described. Only a small indication of the detailed, patient observation entailed is indicated by the text. Repeated observation must be made tactfully, often in exacting conditions, without altering in any way, the habits of the birds by interference.

The monograph is printed in clear type, is well laid out, and the tables are sensibly placed with the appropriate text. In style the book is for the most part very readable and discussion interesting and generally easy to follow. Printing errors are virtually absent.

The book might have benefited from greater use of graphs and histograms in preference to the less digestible tables of figures. More photographs of birds at various stages and of their environment, might perhaps have increased the palatability if not the value of the work. The author should beware of excessive faith in the value of statistics, especially where small numbers are involved. Percentages can be even more dangerous when the nature of the figure representing 100 per cent. varies from statement to statement. This is particularly applicable where birds of approximate age are included to swell the numbers, as it renders deductions less conclusive. Some of the conclusions to discussions on the less measurable processes such as the rates of self-replacement and migration of juveniles, seem open to question and a comparative study in a distant colony would put the ecology in clearer perspective.

These personal criticisms concern but a small part of a commendable piece of original research.

Atomic Energy in Medicine. K. E. HALNAN. Butterworths Scientific Publications, 1957. Pp. 157.

Radioisotopes have not yet found a place in routine clinical veterinary medicine although it can be only a matter of time before the veterinary practitioner must familiarise himself with at least the potentialities of these powerful new tools for research, diagnosis and therapy. Here is a book which provides, in a form designed to be read by those with only a background knowledge of physics (and, if necessary, also of medicine !), an up-to-date and entertaining guide to the applications of atomic energy and radioisotopes in the field of medical science.

After a very easily digested introduction to atomic physics, chapters follow on the principles of use of radioisotopes and on their application in medical research. The fourth chapter outlines the effects of ionising radiations in living tissues and leads logically to the next, which will be of practical interest to the veterinarian, on cancer and radiotherapy : it does not seem beyond the bounds of possibility that telecurie sources for therapy will be available in animal hospitals in the near future. Special applications of radioactive iodine and of radioisotopes in the study, diagnosis and treatment of blood diseases are dealt with in chapters 6 and 7 and are illustrated by details of actual cases. Radioisotope radiography is one of the subjects treated in the next chapter on new aids to diagnosis : it seems possible that thulium-170 sources may replace diagnostic X-ray tubes in the equipment of the practitioner. It is unlikely that high-energy particle accelerators or " atom-smashing machines " will find a direct veterinary application, nevertheless, the intricacies of such costly pieces of equipment as the synchro-cyclotron, the bevatron and the linear-accelerator (in which electrons are said to " surf-ride on the crest of radiowaves ") make chapter 9, which describes their medical use, fascinating reading. In chapter 10 the problems and hazards of radiation are dealt with in their proper perspective. The final chapter entitled " The Future," includes a glimpse of " the local hospital in 1984." A list of suggested further reading is appended and there is an adequate index. The 14 photographs, although verging on the dramatic, are perhaps not out of place in a semi-popular work of this kind.

The only error of importance noticed by the reviewer occurs in Table XI, in which " milicuries " is misprinted for " microcuries " at the head of the first 2 columns. This is likely to prove confusing to the uninitiated reader !

The personality of the author is sometimes a little too intrusive and the veterinarian must be prepared to tolerate diversions, aimed at the correction of popular misconceptions, on such topics as the nature of cancer and the value of *post-mortem* examinations.

A book of this type naturally has its limitations but Dr. Halnan's expressed hope that " it may be found widely useful as an introduction to an interesting new field of medicine," is amply fulfilled.

Medical Bacteriology, including Elementary Mycology and Parasitology. By SIR LIONEL WHITBY and MARTIN HYNES. J. & A. Churchill, London. 1956. 6th Edition, pp. 540. Illustrations. Price 30s.

The preface to the 1st edition of this book stated that its object was "to present in brief form the accepted views on the relation of bacteria to medicine without burdening the reader with a mass of pros and cons. As such it is intended primarily for the medical student and practitioner." Although this preface is not reprinted in this 6th edition it must be presumed that its object remains the same, for its contents are clearly designed as an introduction to and an outline of medical bacteriology. The book is not intended for the practising bacteriologist, but sets out to provide the bacteriological background necessary for those who practise medicine. Nevertheless there is some technical information provided, such as the methods for performing some serological tests, the interpretation of cultural appearances on certain media, and some differential fermentation reactions. This information helps to emphasise the importance of bacteriological diagnosis and therapy which runs throughout the book.

As is to be expected, the descriptions of particular groups of micro-organisms are heavily weighted on the side of medical bacteriology and the veterinary reader will find that much which interests him is missing. Furthermore, some of the veterinary information provided in smaller type is misleading or open to question. Thus on page 239 Johne's bacillus is stated to produce a chronic *granulomatous* enteritis in the cow, and on p. 245 the figure of 40 per cent. is given as the tuberculosis infection rate of milch cows in Great Britain, a figure that was probably gleaned from literature at least 10 years old.

One must be permitted to disagree with the authors' recommendations on certain technical procedures. In a discussion on psittacosis the suggestion that material for diagnosis should be inoculated into mice by the intra-nasal route as well as the intra-peritoneal will be regarded with trepidation by those used to handling this dangerous virus in the laboratory. The much safer and equally effective intra-cerebral route is not mentioned.

Overlooking these minor criticisms the book achieves its object admirably in providing a comprehensive undergraduate text-book of modern bacteriology as applied to medicine. Although the work is not intended for veterinary readers its excellent descriptions of general bacteriological and immunological principles, which despite their complexity are presented in simple and concise manner, suggest that these parts of the book might be helpful to veterinary students.

Vitamin A. By T. MOORE. (Cleaver-Hume Press Ltd. 645 pp. 50 diagrams, 46 plates, 72 tables. 1957). Price 76s.

The brief title of this book should not be allowed to make anyone believe that it is a highly specialised treatise, having real interest only for the very few. It is true that any of the substances which are essential to mammalian life can be described in a very circumscribed manner, one single characteristic of the substance being dealt with in minute detail. On the other hand where not simply the physical and chemical properties of such a substance, but also the whole of its biological relationships, are examined, then a very different situation arises.

Dr. Moore's very readable book is of the second type. It is the result of some 30 years of active work in the field and its comprehensiveness will surprise even those who, like the reviewer, have also worked in that same field for 2 or 3 years. In contrast to many monographs this one is not unduly condensed by the inadequate discussion of experimental findings: one might indeed claim that it is too full, but that undoubtedly is very much a matter of individual taste.

For the general reader there is a good, full, but not too long (29 pp.) historical introduction. Specialisation then begins with a section dealing with the estimation of vitamin A and the provitamins (45 pp.) and continues with sections devoted to the chemistry of these substances (53 pp.), their comparative biochemistry (18 pp.), and the physiology and biochemistry of vitamin A, so far as they relate to mammals and birds (141 pp.).

Many veterinary surgeons will find particular interest in the next section, in which is given a very full account of the pathology of vitamin A deficiency or excess (55 pp.). Section VII, which is concerned with Man, may have less interest for such readers, but the ultimate section (100 pp.) which deals with vitamin A and (a) farm and domestic animals, (b) sex, (c) the thyroid and (d) various nutritional and biochemical mechanisms, and which concludes with a general assessment of present knowledge, cannot be ignored.

There is a long appendix dealing with various experimental matters, followed by author and subject indexes which are as long and as full as one could expect, being far more comprehensive than one usually finds in English texts. Numerous and useful diagrams, tables and plates are well distributed throughout the book, and many are likely to be of great interest to those who work with livestock.

There is a tendency in some quarters to look upon vitamin A as a substance which lost its significance to field workers long ago. This book, together with recent publications dealing with vitamin A deficiency in farm animals, should dispel such notions. In the case of vitamin A and other nutrients, many of which were first isolated some 25 years ago, the early investigators "skimmed the cream" off the experimental work. As will be clear to any of Dr. Moore's readers, fundamental understanding of vitamin A is still very sketchy, despite the hundreds of papers, many very recent, to which the author refers and which he lists in the book.

The paper and printing of the book, as well as the general quality of the illustrations, leave little to be desired, apart from a few dropped letters here and there. The binding is structurally sound, but, if one may be allowed a very minor grumble, why ally an arresting dust-cover with so insipidly decorated a binding? On the other hand, an excellent innovation is the footnote on each right-hand page, giving the page on which references to that chapter are to be found.

News and Comment

THE WELLCOME TRUST

The Wellcome Trustees have recently announced that they will provide a capital grant of up to £50,000 for the building of a Small-Animals Experimental Research Unit at the University Veterinary Hospital in Glasgow. The Veterinary School was incorporated in the University in 1949 and since then full use has been made of opportunities for medical and veterinary workers to collaborate in programmes of conjoint investigations, particularly in the fields of physiology, pathology, bacteriology, and clinical studies.

It is now widely accepted that medical science is a comprehensive study embracing human and veterinary medicine and the establishment of a unit of this nature gives practical expression to this general conception, state the trustees. Much research work already in progress will be continued and extended as a result of the new accommodation which will become available. The new unit has been designed in the light of experience gained over the last few years and it has been possible to combine the knowledge and requirements of both the medical and veterinary professions in the final plans.

PROFESSOR G. H. WOOLDRIDGE

The Memorial Service for the late Emeritus Professor G. H. Wooldridge will be held at Holy Trinity Church, Kingsway (opposite the Holborn, Kingsway, tube station), at 12.15 p.m. on Friday, November 15th, 1957.

Dr. W. M. SCOTT

Dr. William Morgan Scott, who died on October 11th at the age of 87, was for more than half a century a noted veterinary surgeon in the West of England. He was educated at St. George's School, Edinburgh, and the Royal (Dick) School of Veterinary Studies, qualifying in 1894. Soon after qualifying he set up in practice in Bridgwater, Somerset, and remained there for more than 60 years.

Before the First World War he visited Denmark to advise on the setting up of laboratories and to lecture on the use of vaccine against swine fever and swine erysipelas. He received his doctorate from the Zürich University for his work on wooden tongue in cattle. He was the author of " Indexed System of Veterinary Treatment " and " Vaccine Therapy in the Treatment of Animals." He was formerly editor of the *Veterinary News*.

Dr. Scott was a Fellow of the Royal Society of Medicine (Edinburgh), a Freeman of the City of London, a Fellow of the Royal Microscopical Society, founder and first president of the Mid-west and South Wales Veterinary Association, and Knight Constable and Master of the Horse of the Knights of the Round Table of King Arthur.

The funeral took place at St. Mary's Church, Bridgwater. Among the many mourners were Mr. John Cameron, M.R.C.V.S., representing the Ministry of Agriculture, Mr. L. W. Bovett, M.R.C.V.S., representing the Mid-west and South Wales Veterinary Associations and Mr. J. J. Weats, M.R.C.V.S., representing Bristol University.

THE ROYAL SOCIETY OF HEALTH

The Royal Society of Health announces that Lord Cohen of Birkenhead has accepted nomination as President of the Society in place of Lord Percy of Newcastle who has decided to retire for health reasons. Lord Cohen's election will take place at the Society's Annual Meeting in May, 1958.

" THIS HEXOESTROL BUSINESS "

Under this title a conference " to consider the use of synthetic oestrogens in meat production " was organised by the North of Scotland College of Agriculture and held at the Douglas Hotel, Aberdeen, on October 16th. The speakers were Dr. T. L. Dodsworth, lecturer in Animal Husbandry at the College; Mr. P. L. Shanks, Senior Veterinary Investigation Officer with the College; Mr. John A. Crichton, Head of the Applied Nutrition Department of the Rowett Research Institute; and Mr. W. M. Justice, Manager of the fresh meat and poultry department of Messrs. J. Sainsbury Limited, London. The Chairman was Mr. J. Mackie, Vice-Chairman of the Board of Governors of the College. The following papers were read: " The Use of Hexoestrol in Beef Production " (Dr. T. L. Dodsworth), " Experience of Hexoestrol-treated Carcases " (Mr. W. M. Justice), " Hexoestrol Treatment of Sheep " (Mr. John Crichton), " The Veterinary Aspects of Hexoestrol Administration " (Mr. P. L. Shanks), and a lively discussion followed.

It is hoped to publish summaries of the papers and the discussion shortly.

ELECTRICAL EUTHANASIA CABINETS

We are advised by the British Standards Institution that the new British Standard (B.S. 2909 : 1957) sets out requirements for the construction, safety, and performance of electrical euthanasia cabinets for dogs. The objects of the standard are to ensure the use of cabinets which are humane in operation and which are safe as far as the operator is concerned. Readers will recall that the B.V.A. played a leading part in this matter through a special committee under the chairmanship of Mr. A. Thomson. Other organisations concerned were UFAW, Our Dumb Friends' League, and the Royal Society for the Prevention of Cruelty to Animals.

MEAT PRESERVATION IN UNDERDEVELOPED COUNTRIES

With reference to the paper entitled " Oxytetracycline and its use as a Meat Preservative in Underdeveloped Countries," by Ginsberg, Hill, and Grieve, published on October 19th, we are asked by one of the authors to make clear that the oxytetracycline (as Biostat) was supplied gratis by Pfizer Ltd., Folkestone, and not by Chas. Pfizer, Cyanamid, of Great Britain, as incorrectly stated in a footnote.

IN MEMORY OF PROFESSOR G. H. WOOLDRIDGE

We are asked to publish this further list of contributors:—

Mr. and Mrs. E. Cotchin, Mr. R. C. U. Fisher, Professor C. Formston, Mr. C. W. Francis, Mr. L. St. Bel Golledge, The Hendon Club, Mr. J. W. H. Holmes, Professor J. McCunn, Mr. W. G. R. Oates, and Mr. J. F. C. Ward. The total is now £70 1s.

PERSONAL

Births

BLANDFORD.—On October 16th, 1957, at the Lydia Beynon Maternity Hospital, Newport, to Sheila, wife of Trevor B. Blandford, B.V.SC., M.R.C.V.S., of the Veterinary Department, Bamenda, Southern Cameroons, a son, Robert Alan.

FRANK.—On October 23rd, 1957, to Wendy and Charles Frank, M.R.C.V.S., of Letcombe House, Wantage, Berks, a son, Nigel James.

STEVENSON.—On October 21st, 1957, to Margaret, wife of Donald Stevenson, B.SC., B.V.SC., M.R.C.V.S., of the School of Veterinary Medicine, Madingley Road, Cambridge, a daughter, Jennifer Mary.

It may be of interest to many of his old friends in Britain and overseas to learn that **Major-General E. R. C. Butler,** C.B., C.M.G., D.S.O., F.R.C.V.S., who is resident in Kokstad, S. Africa, attained his ninety-third birthday last June. He would like to hear from any of his friends.

R.C.V.S. OBITUARY

We record with regret the death of the following member of the profession:—

HAMILTON, James Crawford, of 126, Queen's Drive, Glasgow, S.2. Graduated London, July 12th, 1929; died October 21st, 1957.

COMING EVENTS

November

6th (Wed.). Meeting of the Midland Counties Division at the Regent Hotel, Leamington Spa, 2.30 p.m.

7th (Thurs.). General Meeting of the Central Veterinary Society at the Royal Veterinary College, Camden Town, N.W.1, 5.30 p.m.

8th (Fri.). R.V.C. Students' Union Commemoration Ball, 8 p.m. to 2 a.m.

Annual General Meeting of the Royal Veterinary College Association in the R.V.C., Camden Town, London, N.W.1, 5.30 p.m.

14th (Thurs.). Annual Dinner and Dance of the Victoria Veterinary Benevolent Fund in the Northern Hotel, Aberdeen, 7.30 p.m.

15th (Fri.). First Meeting of the South-east Region of the British Small-Animal Veterinary Association at the Kingsway Hotel, Kingsway, Hove, 6.30 p.m.

18th (Mon.). 8th Annual Dinner-Dance of the University of Bristol Centaur Society at the Berkeley, Bristol.

20th (Wed.). Meeting of the British Small-Animal Association, Midland Region, at The Flying Horse Hotel, The Poultry, Nottingham, 2.30 p.m.

22nd (Fri.). Ordinary General Meeting of the Royal Counties Veterinary Association at the Caversham Bridge Hotel, Reading, 2.30 p.m.

27th (Wed.). Southern Counties Veterinary Society and N.A.A.S. Joint Grassland Symposium at the Royal Hotel, Winchester, 8.15 p.m.

Meeting of the Scottish Regional Group of the A.V.T. & R.W.S. in the Pathology Lecture Room, The Royal (Dick) School of Veterinary Studies, Edinburgh, 9, 2.15 p.m.

29th (Fri.). Golden Jubilee Dance of the North of Ireland Veterinary Association at the Grand Central Hotel.

BRITISH VETERINARY ASSOCIATION QUARTERLY MEETINGS IN LONDON

Wednesday, November 13th, at No. 7, Mansfield Street.

10.30 a.m. Small-Animals Committee.
2.00 p.m. Parliamentary and Public Relations Committee.
4.00 p.m. Home Appointments Committee.

Thursday, November 14th, at No. 7 Mansfield Street.

10.00 a.m. Veterinary State Medicine Committee.
11.30 a.m. Farm Livestock Committee.
12 noon Finance Sub-Committee.
2.15 p.m. General Purposes and Finance Committee.

Friday, November 15th, at the Connaught Rooms—

10.15 a.m. Meeting of Council.

THE VICTORIA VETERINARY BENEVOLENT FUND

The Annual Dance of the County of Ayr Ladies Guild will be held in Western House, Ayr, on Thursday, November 21st. Tickets, price one guinea, may be obtained from Mrs. A. L. Wilson, 31, Ashgrove Street, Ayr (Telephone: Ayr 65757).

ADDRESSES OF DISEASE INFECTED PREMISES

The list given below indicates, first the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

Anthrax

Staffs. Whartons Pool Farm, Rode Heath, Stoke-on-Trent (Oct. 25).

Fowl Pest

Cambs. Holly Farm, Murrow, Parsons Drove, Wisbech (Oct. 23).

Essex. Floradene, Lodge Lane, Collier Row, Romford (Oct. 21).

Hereford. Rowley Cottage, Hamnish, Leominster (Oct. 21).

Herts. Wormleybury Estate, Broxbourne (Oct. 25).

Kent. The Rosary, Bekesbourne, Canterbury (Oct. 16); Elm Court Farm, Hillborough, Herne Bay (Oct. 21).

Lancs. Cotham Farm, Cotham Lane, Longton, Preston; Waltons Farm, Longmeany Gate, Midge Hall, Preston (Oct. 16); Knowles Farm, Ratten Lane, Hutton, Preston; Ivydene, Longmeany Gate, Leyland (Oct. 21); Whiteleys Farm, Croston, Preston; 27, Southlands Drive, Leyland, Preston; 123, Slate Lane, Leyland, Preston; Midge Hall Farm, Midge Hall, Preston; Brookfield, Skip Lane, Hutton, Preston (Oct. 22); Riescar Villa, Smithy Lane, Much Hoole, Preston; Hungry Hill Farm, Much Hoole, Preston (Oct. 23); Chingle Hall Farm, Goosnargh, Preston; Walmsley Farm, Cuerden Green, Lostock Hall, Preston; Firs Farm, Hall Lane, Hindley, Wigan (Oct. 24); Moor House, Land Lane, Longton, Preston; Honiton, Drumacre Lane, Longton, Preston; Earls Farm, Lea, Preston; Worsleys Farm, Skip Lane, Hutton, Preston; Steadson, Skip Lane, Hutton, Preston; Lesser Marsh Farm, Little Hoole, Preston; Birshaw Farm, Shaw, Oldham; Seaview Farm, Much Hoole, Preston; 148, Slater Lane, Leyland, Preston (Oct. 25); Oak Farm, Newton, Kirkham, Preston; Woodland, Ratten Lane, Hutton, Preston (Oct. 26); Fair View, Mains Lane, Little Singleton, Blackpool; Ravenscroft, Much Hoole, Preston (Oct. 27).

Lincs. Hawthorne Farm, Quanock Gate Road, Sutton St. Edmunds, Spalding (Oct. 16).

Norfolk. Clint Green Farm, Yaxham, Dereham (Oct. 16); Mill Lane, Hockwold, Thetford (Oct. 22); Clint Green, Yaxham, Dereham (Oct. 23); The Lord Nelson Inn, Yaxham, Dereham (Oct. 26).

Oxon. 11, Council Houses, School Lane, Stoke Row, Henley-on-Thames (Oct. 26).

Suffolk. Torbay, The Park, Great Barton, Bury St. Edmunds (Oct 25); Church Farm, Kenton, Stowmarket (Oct. 26).

Swine Fever

Berks. Bridges Farm, Mortimer, Reading (Oct. 24).

Dorset. Pamphill Dairy, Pamphill, Wimborne (Oct. 16).

Essex. The Vineries, Howe Street, Great Waltham, Chelmsford (Oct. 24).

Hants. Pondside Farm, Meonstoke, Southampton (Oct. 16); Lower Mill Farm, Union Lane, Kingsclere (Oct. 22).

Kent. 212, Bredhurst Road, Wigmore, Gillingham (Oct. 25).

Lancs. Lower Kilshaw Farm, Carleton, Blackpool (Oct. 17).

Leics. 53a, Sapcote Road, Burbage, Hinckley (Oct. 16); Websters Dairy, Saxelby; 80, Saxby Road, Melton Mowbray (Oct. 17); Quorn Lodge Farm, Loughborough Road, Quorn, Loughborough (Oct. 23).

Lincs. Broadfield Lane, Boston (Oct. 21).

Notts. Glebe Farm, Norwell, Newark (Oct. 23).

Shrops. Welbatch Farm, Welbatch, Anscroft, Shrewsbury, Salop; Astley House Farm, Alveley, Bridgnorth (Oct. 23).

Staffs. Smallholding, Quarry Heath, Penkridge (Oct. 23).

Suffolk. Church Farm, Cransford, Woodbridge (Oct. 23).

Surrey. Valverian Farm, Hydon Heath, Bushbridge (Oct. 25).

Sussex. Lodgefields Farm, Withyham, Hartfield (Oct. 22).

Wilts. Springfield, Calne (Oct. 25).

Worcs. 1, Union Lane, Droitwich (Oct. 25).

Yorks. Hew Clews Farm, Hollybank Road, Great Horton, Bradford (Oct. 16); Little Middop Farm, Middop (Oct. 17); Grove Farm, Bilton-in-Ainsty (Oct. 25).

FIFTY YEARS AGO

The teaching staff of the Royal Veterinary College had been under fire for alleged undercutting of fees in the treatment of animals used for demonstration purposes. A correspondent wrote as follows:—

Sir,—Evidently "London Practitioner" is irate with me when he says some of my criticism seems to be anything but sensible. I think this remark applies to himself when he suggests a certain section of the profession "are apt to talk rubbish about the College, etc.," and asks them to make sure that the fees of the College are really lower than those obtained by the rank and file of the profession.

Perhaps "London Practitioner" is prepared to give your readers evidence in support of his sensible criticism and to inform us there are practitioners in the Metropolis who undertake to examine five horses as to soundness and give certificates, and examine as many sick or lame horses and give advice as a subscriber likes to send to his establishment for the munificent sum of £2 2s. per annum.

I am, however, afraid this gentleman will not be able to find anybody who does such cheap practice, and I think at least it is insulting to practitioners to suggest that a M.R.C.V.S. outside the R.V.C. estimates his services at such a rate.

There is no similarity between the action of London Practitioner's supposition and that of the R.V.C. action towards its graduates. I do not think there are many ex-pupils who would enter into competition with their former preceptors, let alone a preceptor such as "London Practioner's," who would enter into competition with his pupil an action such as the R.V.C.s.

As to the College being in existence before the graduate, it is only natural. You must have a mother before you are a child. But does the parent enter into competition with its child? The student is the mainstay of the College and of its teachers; without his fees these would be defunct. As it is, we are told the College is in a bad way notwithstanding the students' fees have risen from £20 to £84 the course, and an abundance of material in the shape of horses and dogs taken in for examination, advice, keep or treatment at a cheap rate. Certainly if this be so, there must be something wrong. We are all agreed that the student must have material for clinical instruction. But as business men would it not be better if we got double the amount of money for half the amount of material? If this principle were adopted by the R.V.C. it would not overwork the professors by doing cheap practice, but afford them more time to give a better clinical instruction to their pupils.

It may be gratifying to have a great number of cases for the students to see. But it would be more profitable to them if they were to see less and observe more. In other words, if they were instructed thoroughly and cross-examined severely.

Yours, etc.

"Well Wisher."

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

Should We Investigate "The Box"?

Sir,—Recent correspondence regarding the above prompts me to write, not to support what some of your correspondents appear to desire—an investigation of " the Box "—but to try to suggest a rational approach to this much discussed subject.

At the Equine Research Station here, we have had to take some notice of " the Box," as developed by private individuals, and have reached some conclusions.

First, there is the orthodox factual approach. " The Box " has been examined by physicists, medical, veterinary, and other scientists, and it may as well be stated quite summarily that " the Box," its contents, its diagnostic performance, its analyses, and its " treatment," are not based upon any accepted physical or biological principles. The construction of " the Box " just does not make any sense to the physicist—electrical or otherwise—the diagnostic results are sometimes, to say the least, astonishing, and as for " treatment " it must surely have occurred to many that a claim to be able to influence the detailed physiology of one individual animal or human being, among many others, from " the Box," dozens or hundreds of miles away by invisible, intangible, imperceptible, and indeterminable (one might say imaginary) " radionic " waves, taxes one's credulity to the uttermost.

The adjective " radionic " does not appear in most dictionaries, but " radion " is defined as: " One of the radiant particles thrown off by a radio-active substance."

If the word " radionic " is used in its correct sense, therefore, a radio-active element must be involved in its generation, but in view of the very astonishing reservation given to Mr. Robb in the report he quotes in a recent issue of THE RECORD, which is worth repeating, *viz.* " This is a radionic (*sic*) analysis and *must not be interpreted by medical terminology*," an understanding or appreciation of this extraordinary nomenclature becomes impossible. The " radionic " waves are not in fact radionic; they are something else, but no effort is made to enlighten us just what they are or how this and other terms are to be interpreted. However, even if all possible allowance is made, the diagnostic report quoted by Mr. Robb and many others besides, not only makes no sense, but is rubbish which would do no credit to a school child.

We here have examined blood samples from 5 horses diagnosed by " the Box " as *gravely anaemic* and unless treated by " the Box " doomed to die in 3, 4, or more months. We found the samples to be perfectly normal in R.B.C. count, haemoglobin content, haematocrit and E.S.R. readings. Moreover, determinations made independently by other laboratories agreed closely with our findings. The owner declined to have any treatment by " the Box " and no further contacts occurred between " the Box " and the horses. These examinations first began in 1952, and the horses are still alive and in good health without any help from " the Box."

In another case, a 2-year-old filly, vaguely ill, was submitted to " the Box " and diagnosed as suffering from leukaemia. Examination of a blood sample carried out here shortly afterwards disclosed a perfectly normal red blood cell picture and a total lymphocyte count of 5,400, amongst a total leucocyte count of 13,500, which gives no evidence of a leukaemia. Clinical examination showed no sign of any enlarged lymph nodes or any other symptoms which might point to the existence of this condition in the filly. " The Box " report advised the owner to ask his veterinary surgeon to " treat the horse for leukaemia."

It is hardly worth while mentioning that leukaemia is extremely rare in horses, if indeed it occurs at all, and that in both man and animals it is progressive and ends fatally in spite of treatment. The filly concerned is still alive and well.

Many other instances could be given of erroneous, misleading, or nonsensical reports which have come to our knowledge, received by sadder and wiser animal owners who, in the absence of any improvement, turned back again to orthodox methods of diagnosis and treatment by members of our profession. Perhaps the acme of " radionic " nonsense was reached when one particular horse was diagnosed by " the Box " as " Suffering from a guilt complex " among other disabilities! The owner's comment was most apposite: " So he jolly well should be: he hasn't been even placed in his last four races."

So much for the orthodox approach, and very much more could be said.

It remains to consider whether " the Box " idea is based upon some other principles; something beyond or above our present levels of knowledge of physics and veterinary medicine.

In the more remote parts of north-western Scotland, in Ireland, and in Scandinavia, there are those who are reported to be fey, to possess the second sight; while not so very many generations ago witches were caught, browned in the fire, and burned at the stake in many parts of Britain. There are those who, apparently perfectly genuinely and with deep conviction, still believe in ghosts, brownies, kelpies, elves, pixies, little brown men, and other non-physical phenomena. There are in Africa and among other ancient civilisations doings and happenings which for one reason or another cannot readily be explained by reference to normal orthodox physical and biological laws. There are magic rites and black magic ceremonies. There are metaphysical beliefs and phenomena of all kinds almost everywhere.

It is important to appreciate that the operators of " the Box " claim that only certain " special persons " can operate it. The response obtained depends entirely upon the touch of the operator's fingers, not the dials or switches or anything contained in " the Box." In other words, " the Box " is not an instrument which measures or records, but a piece of inert apparatus, not perhaps greatly differing from the witch-doctor's head-dress, which plays a sort of

ceremonial part in a purely human and subjective performance. In the photographic process, similarly, a special human being must first " condition " the negative before it will " register " the " radionic " picture.

After careful consideration of available evidence, I submit that only if the B.V.A. is prepared to abandon factual matters and to throw aside all the knowledge painfully and painstakingly acquired by well-tried experimental and investigational work, can an investigation of " the Box " be considered and justified. If one believes in ghosts and witchcraft, well, one believes in ghosts and witchcraft, and one can equally believe in the magic of " the Box." If one believes in sound biological principles, and since accumulated experience has shown that a rational, common-sense approach to diagnosis and treatment in animal disease will, aided by Nature, result in amelioration, control, and a return to normal health and function in a proportion of cases, and that in certain conditions, no matter what is done, control or cure are not possible, then one is surely upon safe ground, boxes and witchcraft notwithstanding.

Regarding lay owners of animals, one must appreciate their points of view. A sick or injured animal is always either distressing or embarrassing or both. Cure or recovery is often slow and sometimes costly and tiresome. Any new thing, backed by extravagant claims, especially if it encourages the man with an untrained mind to expect a short cut back to health for his beast, has a good chance of flourishing at least for a time until it slowly dawns upon him that it is not such a good thing as expected. The powers of adaptation and compensation, the capacity for the restoration of normal form and function possessed by both the human and non-human animal, are all so great that ultimate spontaneous recovery is extremely common. Where " the Box " has been employed, " the Box " will be hailed as the agent responsible for the good result. It would be a reasonable estimate that among any considerable number of the cases submitted to " the Box " for " treatment " about half could be expected to recover with rest and time only. So the operators of " the Box " are on a good wicket, and why should they really bother about an accurate diagnosis, using accepted medical terms? The more the " diagnosis " or " analysis " is wrapped up in phraseology which is meaningless to professional or lay mind, the more does it savour of mystery or magic and the more it will appeal to those who have acquired a belief in these things.

It seems to me, then, that the time has come to decide whether the B.V.A. should align itself on the side of factual, objective, scientific medicine, or whether it will walk over to the side of the ghosts and the spirits. If the former decision is reached, then there can be no logical reason for wasting money and time in " investigating " " the Box "; if the latter, one is tempted to ask how it is proposed to limit the " investigation." Can it indeed be limited to only one small aspect of a very wide metaphysical world, where the frontiers are ill-defined and the subject bristles with intangible, imponderable, shadowy, subjective ideas, impressions, and beliefs, and where even the nomenclature used is borrowed but not defined? Must it not indeed logically embrace the whole of the subjects of thaumaturgy, necromancy, spiritualism, and whatever else is concerned?

Further, by giving such countenance to " the Box " as would naturally be associated with and follow any " investigation," one could logically postulate that thereby we would be depriving the animal of the benefits of the application of known orthodox measures for the relief of pain and suffering in at least a proportion of the cases under investigation. This could not be reconciled with those Aesculapian principles of which the profession has cause to be proud. Those who undertook the " investigation " would have to consider carefully how best they could reconcile the " treatment," for example, of a compound fracture by long-distance " radionic " waves, or the control of an acute bacterial infection by the same means, with their knowledge of the normal principles of surgery or medicine. There might well be much heart-searching, not to mention the risk of action by those organised bodies who have assumed the guardianship of animals against cruelty and ill-treatment.

Finally, and in view of thoughts provoked by recent correspondence on " The Rights of Animals," I cannot but help wondering what the attitude of the Church and organised religious bodies, might be to " the Box " (most especially perhaps those which so roundly condemn dabbling in witchcraft). So far as I know, they have not specifically declared their standpoint up till now, but I very much doubt if they are aware of what exactly is involved.

With due apologies for the length of this letter,

I am, Sir,

Yours faithfully,

WM. C. MILLER.

The Animal Health Trust,
Equine Research Station,
Balaton Lodge,
Newmarket,
Suffolk.

October 22nd, 1957.

Sir,—I think that at least one investigation should be undertaken regarding " the Box." So far as I am aware the manipulators of these extraordinary contraptions are not veterinary surgeons and yet they purport to diagnose and treat the diseases of animals. This would appear to be a direct contravention of the Veterinary Surgeons Act, 1948.

Since veterinary surgeons are not allowed to enter into consultation with unqualified people it would appear that any investigation of " the Box " would require to be instituted and conducted by the Council of the R.C.V.S. In the meantime it seems that the possession of a " Box," or a fantastic metaphysical theory, allows some persons to defy the law.

Yours faithfully,

MILLER WATSON.

11, Annfield Place,
Glasgow, E.1.

October 20th, 1957.

Sir,—I suggest that those amongst us who think we should investigate " the Box " ought first to read *New Worlds Beyond the Atom*. This book purports to be a serious (*sic*) exposition of the beliefs of those who operate the Oxford machine. I then suggest that those who succeed in completing the book, and still think there is something more than gadgets in " the Box," might reconsider whether they really ever grasped the scientific principles (fundamental and otherwise) which they were taught during their professional courses.

It might be more to the point if the Royal College established whether the use of this apparatus by unregistered people to treat animals (for substantial fees) constitutes a breach of the Veterinary Surgeons Act. If this is indeed unlawful practice one would expect the College to act appropriately, undeterred in their pursuance of the proper course by the fact that even members of the aristocracy are amongst the clients of " the Box."

Yours faithfully,

LEO WM. MAHAFFEY.

Kennett,
Newmarket.

October 20th, 1957.

The " Rights " of Animals

Sir,—Three quite separate questions, arising out of Mr. Bywater's admirable article, seem to have got mixed up. (1) A question of the meaning of a word: if we define " rights " as the Thomists define them, then animals have none; but if we define " rights " to mean that their possessor is the object of obligations imposed on citizens by law, then animals do possess the rights conferred on them by certain British statutes. (2) A question of fact: are the souls of animals immortal? Aquinas, following Aristotle, said no; others say yes. There seems to be no sure way of settling the question. (3) A question of ethics: are animals entitled (whether or not they have souls makes no difference here) to be treated with humaneness and respect? All your correspondents, in their various degrees, seem to say yes.

Yours faithfully,

C. W. HUME.

The Universities Federation for Animal Welfare,
7a, Lamb's Conduit Passage,
London, W.C.1.

October 24th, 1957.

Radioactivity Risks for Animals

Sir,—One of the nuclear reactors at Windscale plutonium factory, Cumberland, became overheated during the night of October 10th, resulting in the contamination of some 200 square miles by a volatile poison; a radio-isotope named Iodine 131. In the opinion of officials, as reported in *The Times* of October 14th and 23rd, the amount of deposited radio-active iodine was " no hazard to people in the area, and there was no danger to animals." " Since milk is largely drunk by young children and forms a higher ratio of fluid intake to bodyweight," it was decided to suspend distribution of milk from local farms. " Radio-active iodine decays very rapidly " from contaminated milk and from butter and cheese made of such milk. With regard to contaminated vegetation " the amount on the outer leaves would be extremely small—probably so small as to be extremely difficult to measure." " I think," said an official, " we have done right in letting the [cattle] markets go on, because I am sure there is no danger from the milk of those [contaminated] animals."

The public health authorities do not appear to have been informed or prepared for discharging their duties to their public. Local veterinary surgeons were equally unprepared for dealing with contaminated animals. Nevertheless, I see no point in our holding a *post mortem* over the Windscale accident. The atomic-energy industry in the British Isles is rapidly developing and we must be prepared for accidental liberations of its products with consequent danger to living things.

I hope the accident will induce the President and Council of the B.V.A., at the forthcoming quarterly meetings, to consider ways and means of enabling the profession to discharge its duty. It seems to me that we have a duty to acquire information upon the methods of diagnosis, treatment, and disposal of contaminated animals and to secure government recognition of our place in future control measures and legislation.

Furthermore, I hope research on the veterinary aspects of the matter will be undertaken by *veterinary surgeons* (as at the teaching Schools and the Ministry), and will provide information on the intake of radio-active poisons; their absorption by, accumulation in, and excretion from, the organs; and their acute and chronic pathological effects.

Yours faithfully,
TOM HARE.

529a, Finchley Road,
London, N.W.3.

October 25th, 1957.

Paying for Public Relations

Sir,—I notice in the address given by Brig.-Gen. Wayne O. Kester, President of the A.V.M.A., to the recent A.V.M.A. meeting in Cleveland, that he gives quite a lot of attention to public relations. To me the most significant fact emerging was that their programme last year cost $60,000 representing, in President Kester's view, " a ridiculously small sum." The total membership of the A.V.M.A. was given as 14,569. This represents approximately $4 per member spent on public relations in the year. Our own Association's intentions would appear to anticipate a very much smaller expenditure per member in this important field, which might imply an inadequate appreciation of the need for public relations work.

Judging from the correspondence which took place following the advertisement for a Public Relations Officer, it would appear that members agreed that the sum to be spent was inadequate. In view of this, I wondered what your readers would feel about a suggestion frequently made to me, that the B.V.A. subscription should be increased by one guinea per annum—this money to be entirely devoted to public relations costs. It would be important, of course, that this be strictly carried out and that the extra guinea did not become, like the Road Fund, merely an additional source of revenue.

The total sum resulting from such an increase would surely provide the B.V.A. with the means of carrying out an effective public relations programme which, if it fulfilled all its responsibilities, should more than repay each member.

Yours faithfully,
G. N. HENDERSON.

22, Strand-on-the-Green,
Chiswick,
London, W.4.

October 25th, 1957.

Foot-and-Mouth Disease and Argentine Meat

Sir,—Recently, a Superintending Veterinary Officer attributed an outbreak of foot-and-mouth disease in his area to Argentine meat. A farm dog was given a bone from Argentine beef which had not been cooked, and hence the outbreak which cost £18,216. The time has come when drastic action should be taken against Argentine imports, especially now that we are freeing our own country of TB. which will raise the value of our livestock. The Ministry ought to insist on every side of beef imported from the Argentine carrying a label similar to those which we have on the frozen mutton carcases from New Zealand certifying that the carcase had been inspected by a veterinary surgeon. The name of the veterinary surgeon should be stamped on the label, and it should be stated that the meat is from an animal which was not suffering from foot-and-mouth disease prior to slaughter, and that it had not been in contact with animals affected with foot-and-mouth disease. It should also state that the animal came from an area free of the disease for a period of time to be determined by our authorities.

The Report of the Departmental Committee on Foot-and-Mouth Disease, 1952-4 (Sections 24, 25, 27, 28, and 29), states that:—

"Measures which have long been taken to prohibit or control imports of animals, carcases, and meat that might be dangerous have proved effective except in the case of chilled and frozen meat from Argentine (and other South American countries), which are considered to be responsible for more primary outbreaks than any other single cause.

"The governments of these countries have agreed that animals must be from farms certified free from foot-and-mouth disease and inspected on the farms by government veterinary inspectors. Animals at markets, etc., must again be certified free of the disease before being moved to the slaughter-house and certified again before and after slaughter. Measures are imposed where the disease breaks out in freezing works and other precautions are specified as additional safeguards. The committee found that these undertakings were not always strictly observed owing to the large areas to be covered in the Argentine and the small number of veterinary surgeons employed on the work, with the result that animals may be in the incubative stage before leaving the farms or infected on the journey to the freezing works. Protection by quarantine at the slaughter-house is considered impracticable. 'So long as we have to import meat from South America, and so long as foot-and-mouth disease is endemic on that continent, there must always be a risk that meat coming from there may occasionally be contaminated. Two British veterinary officers are stationed in Argentina to assist in securing observance of the control arrangements, and we were impressed by the efficiency and tact with which they seemed to us to be performing a difficult and delicate task.'"

The Argentine government is apparently incapable of ensuring that they are able to adopt measures which are satisfactory to us and one cannot help but sympathise with the British veterinary officers who have an almost impossible task in attempting to supervise the local services over such a vast territory. That they accomplish anything worth while at all is a sterling tribute to their industry and ability.

We look forward to the time when we can obtain all the meat we require from the Commonwealth where there is no foot-and-mouth disease; then we shall be able to live in peace knowing that the great source of foot-and-mouth disease has been obliterated. Never a year passes without some outbreaks, and most of them are attributed to meat from South America.

Yours faithfully,
G. C. LANCASTER.

Eastwick House,
Evesham,
Worcs.
October 20th, 1957.

DISEASES OF ANIMALS ACT, 1950—GREAT BRITAIN
Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period		Anthrax	AtrophicRhinitis	Foot-and-Mouth	Fowl Pest	Sheep Scab	Swine Fever
16th to 30th September, 1957		3	—	24	39	—	37
Corresponding period in	1956	28	—	17	29	—	27
	1955	26	1	—	18	—	31
	1954	16	—	—	8	—	26
1st January to 30th September, 1957		257	6	64	620	—	727
Corresponding period in	1956	1,146	8	116	516	—	592
	1955	549	5	6	401	—	1,138
	1954	221	4	12	602	—	1,162